AGRICULTURAL EXPERIMENT STATION.

Oregon Agricultural College and Experiment Station

CIRCULAR BULLETIN NO. 6

Alfalfa in Western Oregon

Of all the crops produced upon the farm perhaps no other offers so many attractions and advantages to the farmer as does alfalfa. As an improver of the soil it has few equals and no superiors. As forage for all classes of live stock, whether used as hay, green feed, or pasture, it is unexcelled in yield, feed value, palatability, and permanency of growth. To the farmer keeping cows, hogs, or poultry, it is of paramount value in that it is practically the only forage crop that will supply green feed continuously through lhe dry summer months of this region. In addition to these advantages it is superior to all other crops in quickly improving and maintaining the appearance and selling value of farm lands.

Lack of understanding of the peculiarities of the plant and its requirements, has caused many failures of first attempts at growing the crop in western Oregon. This has led farmers to believe that alfalfa is not naturally adapted to this region. While this to a certain extent is true, yet the difficulties in the way, may and have been largely overcome. The splendid results obtained by the State Experiment Station and other growers in different parts of western Oregon should convince the most skeptical of the great future of the crop in this state. As authentic and accurately measured yields to illustrate the possibilities of the crop here, those recorded at the Experiment Station may be cited. The average of all the yields of the Station field for the last eight years has been 6.2 tons of cured hay per acre yearly, or where cut as a soiling crop, 26.3 tons of green feed per acre. This field has the ordinary heavy silt loam soil typical of the Willamette valley and has received no irrigation, fertilization, or special treatment, whatever. Anywhere in western Oregon where certain primary requirements of the crop are satisfied, the same or better results should be obtained. It only behooves the beginner to secure the best advice obtainable as to methods of growing; start with a small piece; experiment with it until its requirements are learned; gather experience from failures and persist until successful. The reward of such persistence is ample.

GENERAL REQUIREMENTS

The primary requirements of alfalfa are a deep, well drained, sweet and fertile soil, free from weeds. The lands most nearly meeting these requirements are on the slopes of the rolling lands of the valley bottoms; the slopes and tops of the hills surrounding these valleys, or the deep sandy loam river bottoms well above the water level. The ordinary valley low flat lands are not suitable.

The deep feeding tap roots upon whose length these plants depend for securing plant food and moisture, make a soil eight to ten feet in depth imperative. Although alfalfa prefers a sandy loam yet it has proved equally prosperous on the clay loam soils, a clay subsoil or hardpan delaying but not stopping the root growth.

Owing to the need of its roots for air, alfalfa especially when young, and during the growing season, is easily injured by standing water either above or below ground. Root growth stops at once on striking water saturated soil, hence the water table should not be less than eight to ten feet below the surface of the ground during the growing season. Overflow from streams in winter when the plant is dormant does not cause much injury even if continued for several weeks.

Of even more importance to the alfalfa plant than a deep and well drained soil, are the bacteria which produce the nodules on the roots, through which the plant is enabled to draw upon the free atmospheric nitrogen, enriching the plant and the soil with this most valuable of all the plant food elements. Conditions unfavorable to the activities of these bacteria, cause a corresponding lack of prosperity in the growth of the alfalfa. Like the plant roots, these bacteria require abundance of air in the soil, upon which to feed, and also a neutral or slightly alkaline medium in which to work, such as is supplied in limestone soils.

Unfortunately, the lack of lime in western Oregon soils. in addition to the prolonged wet season and the prevailing heaviness of the soil, causes long exclusion of the air and a tendency toward acidity or sourness which is very unfavorable to the alfalfa bacteria. Hence it is, perhaps, that in a majority of western Oregon soils these bacteria are not present, and must be supplied by artificial inoculation after the harmful acidity has been corrected. This correction is accomplished in naturally well drained soils by application of different forms of lime. Water slaked lime most quickly

and directly corrects soil acidity—ground unburned lime more slowly but less expensively—while light annual dressings with land plaster keep it sweet (more or less indirectly) by making the heavy soils more open and friable. The land plaster also assists in making potash compounds for which alfalfa has great need, more available, but to avoid loss through leaching should be used only in small amounts.

The need of a fertile soil for alfalfa growing, while not generally recognized, is highly important. Though the plant draws its most important food, nitrogen, from the air, yet it is a heavy feeder upon the other plant foods of the soil. On naturally unfertile soils, or those run down by continued wheat or other improvident farming, it is necessary to supply immediately available plant food such as well rotted barnyard manure, to carry the young plants through the first two years until their deep feeding roots are established. Such fertilization as barnyard manure or green manure (like rye and vetch plowed under) is best applied to the crop preceding the alfalfa or by preceding it with clover or vetch. Aside from its plant food and moisture retentive value the humus from such fertilization is of great assistance to the alfalfa bacterial activities.

Preparing for alfalfa in the preceding crop is also important in enabling the prospective grower to clean up the weeds. Weeds, because of their more rapid growth, heavy draughts on available plant food and moisture, and their shading, are highly injurious to the young alfalfa. Hence by preceding alfalfa with a thoroughly cultivated crop such as kale, corn, potatoes, or roots, all of which do best heavily manured, the ground is made clean and fertile for the alfalfa.

The causes of failure to secure a stand of alfalfa are generally a poorly prepared seed bed, poor seed, or the wrong time or method of seeding. The causes of the failure of the crop to grow after a good stand has been secured, are either lack of alfalfa bacteria, the need of lime, pasturing when too young, an impoverished soil, over crowding with weeds, a shallow soil, poor drainage, lack of cultivation, or, improper after treatment. A crop properly started and cared for should produce steadily without reseeding for fifty years or more.

PREPARATION OF SEED BED

Owing to the excessive rainfall of winter and the heavy weed growth of early spring, fall sowing of alfalfa has not proved as suc-

cessful as spring sowing. The ground should be plowed deeply in the fall if possible, manured and replowed or disced early in the spring. Where fall plowing cannot be done, the land should be disced and harrowed before plowing in the spring. Spring plowing should be more shallow as a deep loose seed bed is not desirable for alfalfa. After the spring plowing the ground should be frequently harrowed to get rid of the weeds, conserve the moisture, and bring the seed bed into a uniformly fine state of tilth.

CORRECTION OF ACIDITY

If the soil is in the least sour, from 1000 to 2000 pounds of unburned lime—ground or in the lump--should be applied very early in the spring, or in place of this, from 500 to 1000 pounds of water slaked lime may be sown about April first.

Water slaked lime is preferable to the air slaked, as a larger percentage of it is immediately effective. The quick lime may be water slaked by placing it in small heaps at intervals on the alfalfa ground, adding water to each heap at the rate of a bucket per bushel and then covering each heap with a couple of inches of earth. The following day the lime will be found slaked to a dry powder, which may be mixed with earth and spread as evenly as possible over the seed bed and thoroly harrowed in. A half peck heap of quick lime to every two square rods will make a dressing of 1000 pounds of water slaked lime per acre. As a rule, if the soil is at all acid, net less than this amount should be applied, and in many cases double this quantity should be used. This correction of acidity is imperative if alfalfa is to be most successfully produced, and cannot be considered expensive when it is remembered that it need be done but once.

The spreading of the lime is greatly facilitated where a regular lime spreader is used. Such a machine spreads the lime at any rate per acre desired and distributes it very evenly. Spreading lime or land plaster by hand is unpleasant work, especially on windy days and cannot be done evenly, so that some form of lime spreader is of great assistance where large acreages of alfalfa or other legumes are grown. Where a regular lime spreader may not be purchased a first class spreader can be made at home, or a wheelbarrow grass seeder, or an end-gate seeder may be adapted to this use. A manure spreader may also be used for distributing lime by placing dampened straw in the bottom of the machine, and mixing

the lime with a small quantity of damp cut straw or well rotted manure or other compost. A grain drill also may be used for this purpose, altho it does not cover the ground quite as well. Where a spreader of any kind is used, the quick lime may be slaked in large piles at one side of the field. If unburned ground. lime can be secured this is the cheaper form for correction of acidity, but it should be applied earlier in the spring.

SEEDING AND INOCULATION

The seed should be sown from April 20th to May 1st. Just preceding the sowing the land should be inoculated with the alfalfa bacteria by scattering over the seed bed about 200 pounds per acre of soil taken from the surface foot of an old alfalfa field. This alfalfa soil should be mixed with about 400 pounds of the surface soil of the new field to facilitate its even sowing. To avoid exposing the inoculated soil to the sunshine which injures it, it should be sown on a cloudy day or towards evening and immediately harrowed in. If an acre be once successfully inoculated, the next year it will furnish a soil supply for inoculating other land. Little faith should be placed in inoculating the soil through the purchase of inoculated seed as under ordinary conditions, this method is seldom successful.

Immediately following the inoculation, the seed should be sown at the rate of 20 pounds per acre, care being taken to secure pure seed of good germinating qualities. Germination may be readily tested by placing an average 200 of the seed between moist blotting paper, laid between the faces of two dinner plates, and pouring a little water in the lower plate from time to time. If there is any question as to the purity or vitality of the seed, a two ounce sample should be mailed to the Co-operative Seed Laboratory at Corvallis, for examination by experts. This examination is made free of charge. Many failures to secure a good stand of alfalfa are due to poor seed and the vital importance of a careful examination before purchasing and sowing, should not be overlooked. The common variety of alfalfa should be used, preferably, Montana grown seed.

The seed may be broadcasted and harrowed in, but a more even and vigorous stand is secured, especially if the surface soil is a little dry, by drilling the seed in about 1½ inches deep; drilling one half of the seed at a time, crosswise. While drilling crosswise is not necessary, it gives a little better stand. The ordinary grain drill

may be used with a grass seeder attachment so connected as to deliver the seed into the grain tubes. Following the seeding the ground should be rolled well and then very lightly harrowed. Where a corrugated roller is used the light after harrowing is less necessary. The seed should preferably be sown alone, without a nurse crop of any kind.

The field should be mowed whenever the weeds begin to shade the alfalfa; or whenever the growth comes to a standstill or begins to turn yellow; or when the new shoots of the second growth begin to appear; or when the plants show one-tenth in bloom. The cutter bar should be set about five inches above the ground the first year, and the first cuttings if light, be left upon the ground. It is imperative that the crop should not be pastured the first two years.

AFTER TREATMENT

Every year about April first a dressing of about 60 lbs. of land plaster should be applied and while the ground is still soft, thorough cultivation should be given with a disk harrow set straight and weighted and run both ways, followed by the common spike-tooth harrow both ways. When the crop is two years old the spring-tooth harrow should be used after the disk instead of the spike-tooth, as it is a more effective grass puller. This cultivation keeps out grass and weeds; splits the alfalfa crowns and thickens the stand; keeps the surface soil mellow and helps conserve the moisture to carry the crop through the dry months. This cultivation may best be done by a machine called the alfalfa renovator manufactured especially for this purpose. If the soil is poor, a top dressing of well rotted manure applied in the fall will prove beneficial. It is well to let the alfalfa go into the winter with a four or six inch growth.

Where the alfalfa seed has not been examined and dodder appears in the field it should be eradicated at once by mowing the infected spots, covering them with straw and burning, so that parasite and seed may be entirely destroyed. The burned spots may then be worked up and reseeded by hand.

Where dodder has spread all thru the field the only remedy is to plow it up and put in a cultivated crop for several years, taking care not to spread manure coming from dodder infected hay on land to be used for alfalfa.

Gophers, the only pest that alfalfa is usually subject to, may be

kept out of the field by poisoning with strychnine placed in wheat, raisins and carrots. This should be done early in the spring when the gophers first appear. If gophers are given a little attention annually and not allowed to multiply, they cause little trouble.

In pasturing alfalfa, to avoid bloating, cattle and sheep should not be allowed to go on the field with an empty stomach or when the plant is wet, and to prevent rooting, hogs should be ringed. Where cut and fed green to cows, there is no danger of bloating.

An acre of alfalfa will furnish pasture for about ten good sized hogs, or summer green feed for six cows. In pasturing it is important to divide the field into several sections, so that by alternating their use the growth may not be too closely grazed. As the pastured field becomes somewhat uneven in growth, it should be mowed occasionally.

In western Oregon, very commonly the second year is the critical period in the life of this plant. At this age it often makes very little growth and looks yellow and sickly and hence should receive special attention in the way of spring cultivation, land plastering, and later frequent mowings to keep down the weeds. If a good stand is carried through the second year, thereafter the plant comes into full production.

Reports of success or failure in the growing of this crop in western Oregon would be much appreciated by the undersigned.

H. D. SCUDDER, Agronomist,

Corvallis, Oregon, February, 1910. Oregon Experiment Station.